CLAIMS

1. Lighting device comprising an at least partly transparent substrate (20), and a light source (11) made integrally on ~~one~~ a **first** face of said substrate (20), said light source (11) including at least a positive electrode (14) and a negative electrode (13) to supply electric power, interacting with each other and between which at least a luminescent layer of the organic led type (OLED) (16, 17) is located, said substrate (20) being able to diffuse the light generated by said organic led luminescent layer (16, 17), a lenticular optical element (21) being associated on the opposite face of said substrate (20), characterized in that said lenticular optical element (21) to diffuse the light beam **emitted by said light source (11) comprises a plurality of micro-lenses (22) directly molded, by means of a pre-formed mold, on a second face of** ~~is obtained by means of molding in a single piece in~~ said substrate (20) **opposite to the first face** so as to constitute, with said organic led light source (11), an integrated structure to generate, emit and direct the light, ~~said lenticular optical element (21) consisting of micro-lenses (22)~~ each one **of said micro-lenses (22)** ~~cooperating~~ **being coupled** with a relative point of light emission (19) **of said light source (11)** to direct and shape the relative light beam emitted.

2. Device as in claim 1, characterized in that each of said points of light emission (19) consists of crossing points (19), or pixels, between said positive electrode (14) and said negative electrode (13).

3. Device as in any claim hereinbefore, characterized in that said micro-lenses (22) have the relative center located shifted with respect to the relative point of light emission (19).

4. Device as in claim 3, characterized in that said shift is achieved with respect to one and/or the other of the main axes (x, y) of the relative micro-lens (22).

5. Device as in any claim hereinbefore, characterized in that at least some of said micro-lenses (22) are of the diffractive type in order to ~~increase the effect to~~ divert and direct the ray of light emitted by the relative point of light emission (19).

6. Device as in any claim hereinbefore, characterized in that said micro-lenses (22) have a thickness of between 1 and 100 micron (μm), preferably between 1 and 40 micron.

7. Device as in any claim hereinbefore, characterized in that said micro-lenses (22) have a lateral size of between 5 and 1000 micron, preferably between 10 and 300 micron.

8. Device as in any claim hereinbefore, characterized in that the micro-lenses (22) of a relative lenticular optical element (21) are all equal to each other.

9. Device as in any claim from 1 to 7 inclusive, characterized in that the micro-lenses (22) of a relative lenticular optical element (21) are different from each other **in order** ~~according to the desired effect~~ to direct and shape the light beam emitted by the relative point of light emission (19).

~~10. Device as in any claim hereinbefore, characterized in that said lenticular optical element (21) is present on the outer face of said substrate (20) opposite the face where there is said organic led luminescent layer (16, 17).~~

10. Device as in any claim from 1 to 9 inclusive, characterized in that said substrate (20) is made of plastic material.

11. Device as in any claim from 1 to 9 inclusive, characterized in that said substrate (20) is made of at

least partly flexible glass.

12. Method to produce lighting devices comprising at least an organic led-type multi-layer light source (11) and at least an optical system (12) to diffuse and direct the light beams, comprising at least an at least partly transparent substrate (20), at least a lenticular optical element (21) being associated with one face of said substrate (20) **opposite to the face where said light source (11) is provided,** characterized in that said lenticular optical element (21) is ~~obtained integrated~~ **directly molded, by means a pre-formed mold,** on said substrate (20) **to obtain a plurality of micro-lenses (22) each of which is coupled with micrometric precision at least with regard to the positioning with respect an** ~~so as to function as a micro-optical system for the directed and shaped emission of the light beams produced by the~~ individual point of emission (19) of said organic led light source (11), ~~said lenticular optical element (21) being made on one face of said substrate (20) by means of molding~~.

13. Method as in claim 12, characterized in that the molding is performed with nickel molds on which the impressions corresponding to the lenticular optical matrix are obtained with the step and repeat technique.

14. Method as in claim 12 or 13, characterized in that said molding is performed hot.

15. Method as in claim 14, characterized in that the hot molding is performed on an industrial scale with the hot-embossing technique.

16. Method as in claim 12 or 13, characterized in that said molding is performed cold.

17. Method as in any claim from 12 to 16 inclusive, characterized in that the micro-lenses (22) of a same

lenticular optical element (21) are all made equal to each other.

18. Method as in any claim from **12** to **16** inclusive, characterized in that the micro-lenses (22) of a same lenticular optical element (21) are made different from each other so as to perform specific functions of directing and shaping the light beam emitted by the relative point of light emission (19).

19. Method as in any claim from **12** to **18** inclusive, characterized in that said molding takes place after said substrate (20) has been associated with the light source (11).

20. Method as in any claim from **12** to **18** inclusive, characterized in that said molding takes place before the light source (11) has been associated with said substrate (20).

21. Method as in any claim from **12** to **20** inclusive, characterized in that the micro-lenses (22) of said lenticular optical element (21) are positioned shifted with respect to the corresponding crossing point, or pixel, (19) between a positive electrode (14) and a negative electrode (13).

~~23. Mold to obtain a lenticular optical element (21) on one face of a substrate (20) constituting a source of light emission, characterized in that it has at least the operating layer made of nickel.~~

~~24. Mold as in claim 23, wherein said lenticular optical element (21) consists of a plurality of micro lenses (22), characterized in that the mold has impressions corresponding to each of said micro lenses (22) and having a depth of between 1 and 100 micron, preferably between 1 and 40 micron.~~

~~25. Mold as in claim 23 or 24, wherein said lenticular~~

~~optical element (21) consists of a plurality of micro-lenses (22), characterized in that the mold has impressions corresponding to each of said micro-lenses (22) and having a lateral size of between 5 and 1000 micron, preferably between 10 and 300 micron.~~

~~26. Mold as in any claim from 23 to 25 inclusive, characterized in that the impressions are obtained with the step and repeat technique.~~

~~27. Mold as in any claim from 23 to 26 inclusive, characterized in that said impressions are all equal to each other so as to make mating micro lenses (22) of a same lenticular optical element (21) all equal to each other.~~

~~28. Mold as in any claim from 23 to 26 inclusive, characterized in that said impressions are different from each other so as to make mating micro lenses (22) of a same lenticular optical element (21) all different from each other.~~